

## Quiz Questions:

swinging a mass in a vertical plane - tension

angle for a hanging mass swung in horizontal plane

car moving around a corner

A 750kg car is moving 10.0 m/s around a corner with radius 12.0 m.

a) what is the force on the car?

Friction of the tires holds the car in circular motion, = centripetal force

$$F_c = mv^2/r = 750 \times 10 \times 10 / 12 = 6,250 \text{ N}$$

b) what is the minimum coefficient of friction between the wheels and the cement to make the turn?

$$F_f = F_c$$

$$\mu R = 6250$$

$$\mu = 6250 / (750 \times 9.81) = 0.8495 = 0.850$$

c) 1.0 is the maximum coefficient of friction but it reduces to 0.80 for kinetic (skidding) or 0.45 for wet cement. What is the maximum speed the

car can drive around the 12.0m corner?

$$F_f = F_c$$

$$\mu R = mv^2/r$$

$$\mu = \cancel{mv^2} / \cancel{mgr} = v^2/gr =$$

$$v = \text{Sqrt}(\mu gr) = \text{Sqrt}(1.0 \times 9.81 \times 12) =$$

$$10.84988479201508$$

$$10.8\text{m/s} = 11\text{m/s}$$

what angle should you bank the road so a car can make the 12.0m radius corner at 20.0m/s.



$$\tan\theta = F_c/F_g = mv^2/r / mg$$

$$\tan\theta = v^2/rg =$$

$$\theta = \text{Atan}((20 \times 20)/(12 \times 9.81)) =$$

$$73.60084393823207 = 74^\circ$$

Q1-5 and 1-15 odds